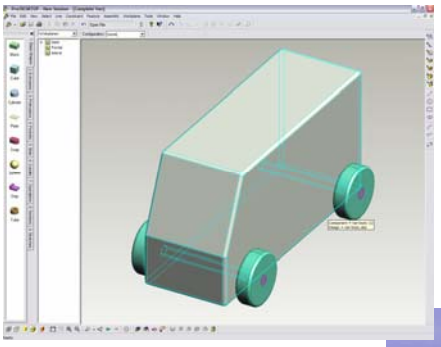
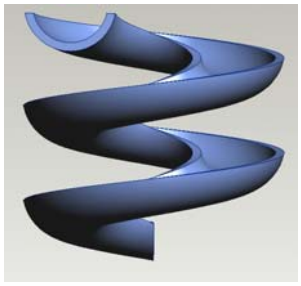
3-D Solid Modeling and Design

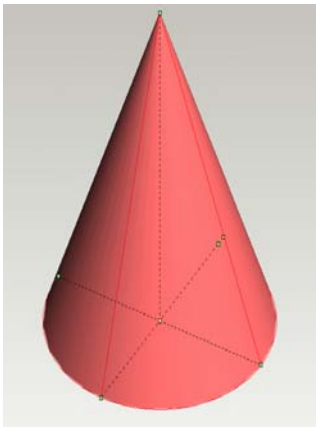
Student Learning Activities for

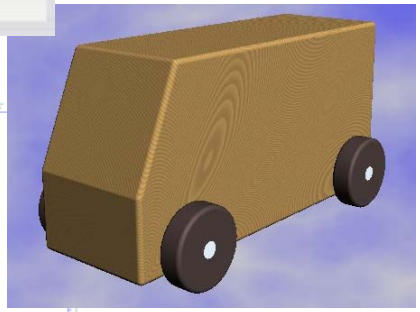
Activity #1

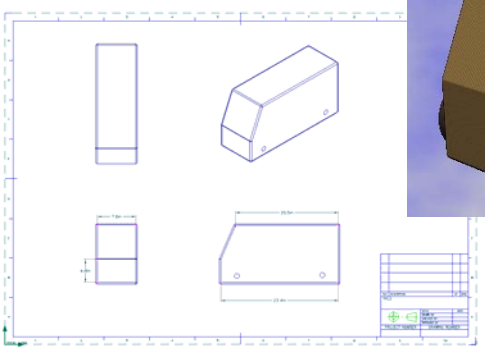
PTC Pro/DESKTOP® 8.0

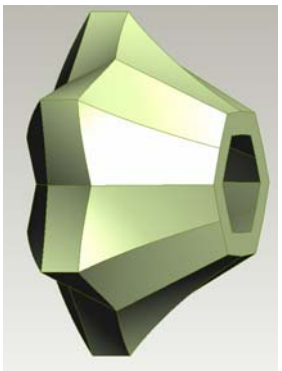












Activity 1:

"What I know and what I need to know"

(Flesch-Kincaid readability level = 6.4)

About the program

Pro/Desktop (called 'PD' from now on) is a powerful software program that allows you to sketch ideas first, and then work on design details later.

This activity will help you:

- Memorize the following PD user terms and their meaning
- Complete basic computer functions to start a design file in PD

User Terms:

- Graphic User Interface (or, GUI)
- Icon
- Cursor
- Pull-down menu
- Sketch
- Design field
- Workplane
- Isometric
- Axes
- Point of origin
- Object Browser pane
- 2D (2-dimension) Drawing
- 3D (3-dimension) Design
- Toolbars
- 'Active' workplane

What you should know before starting:

In order to do well on this and future PD activities, you will need to be comfortable with the following:

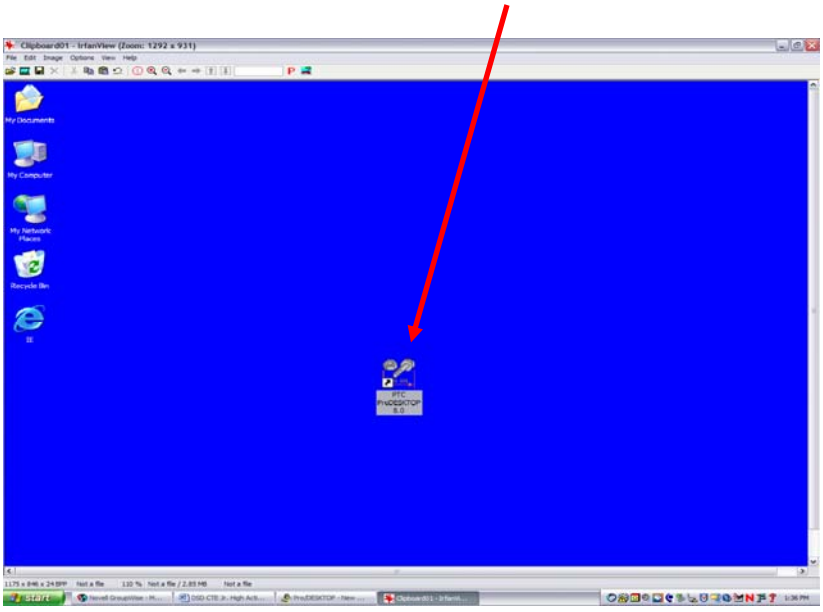
- General uses of the Windows® OS (Operating System)
- Mouse commands using: right-click, left-click, double-click, middle-click or scroll wheel use
- Keyboard layout

If you are not familiar with these skills and knowledge, please 

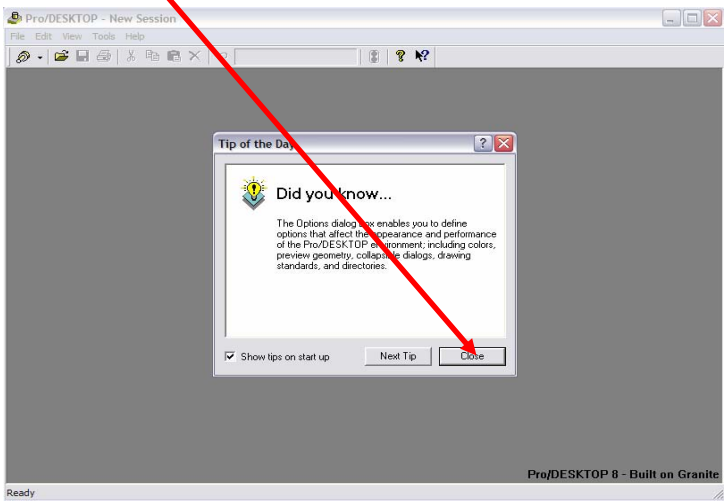
this activity and return to this point when you and your instructor are comfortable that you can proceed.

The beginning: "I have an idea!"

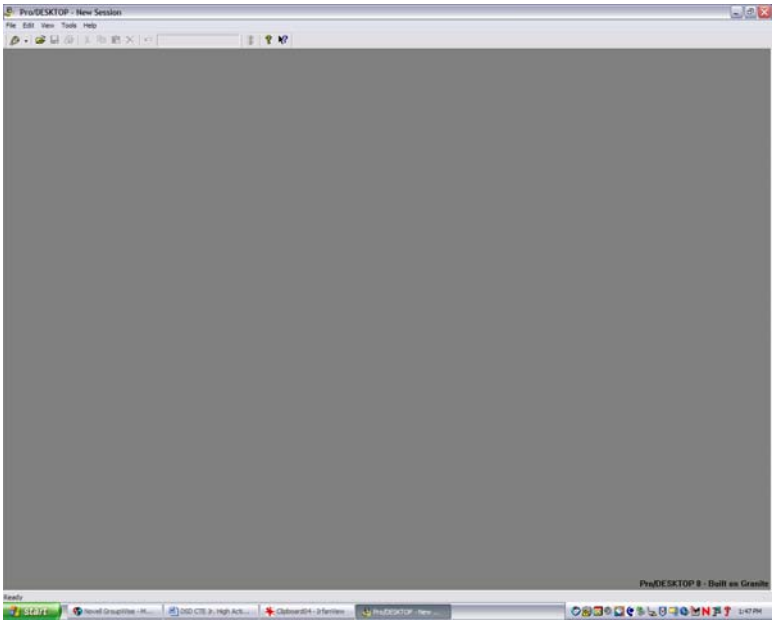
Step 1: Open PD by finding the PD **icon** (A picture on the computer screen that activates a command) on the desktop screen of your computer. Double-click the icon.



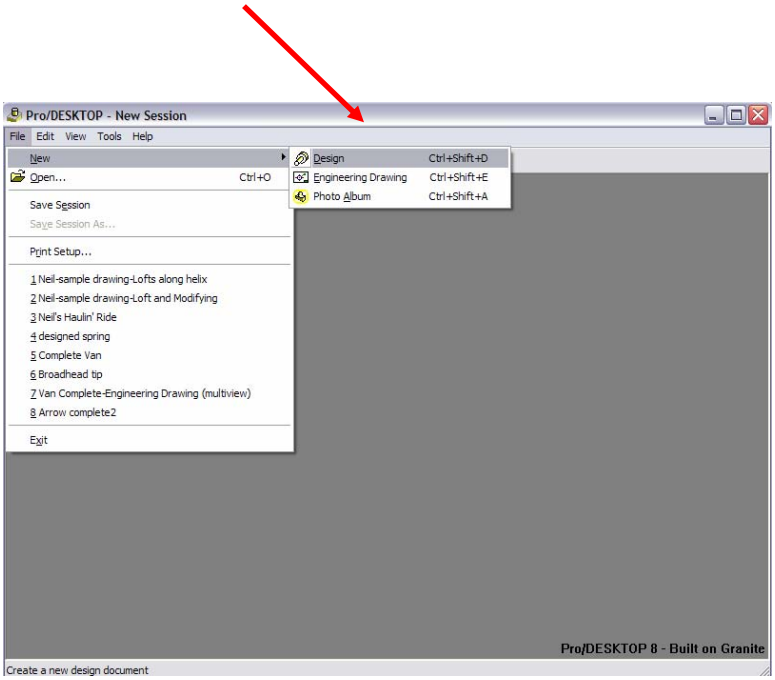
Step 2: You may have a 'Tip of the Day' window pop up before you can actually run PD. These tips are useful, but not necessary at this time. Click on the 'Close' button.



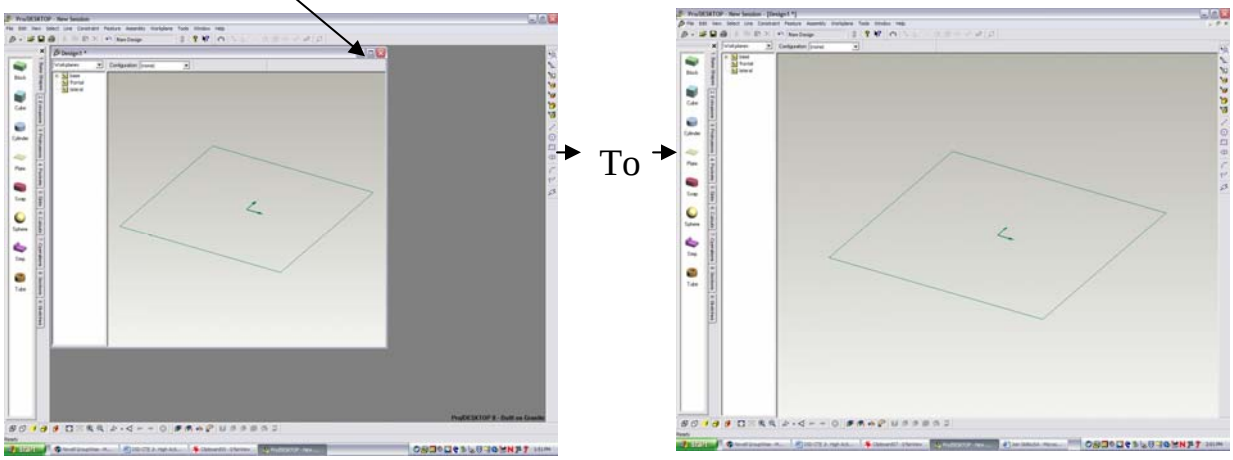
The PD ‘screen’ that you see is called a **Graphic User Interface**, or, **GUI** (pronounced “gooey”). GUI’s show the user what items are in view and what options a person can use as he or she runs a computer program.



Step 3: Create a new Design File by left-clicking once on the ‘File’ pull-down menu. **Without clicking**, slowly move the **cursor** (mouse pointer) over the word ‘New’. Another **pull-down menu** (words in the top toolbar that activate commands) will appear. Slowly move the mouse over the word ‘Design’ and left-click once.

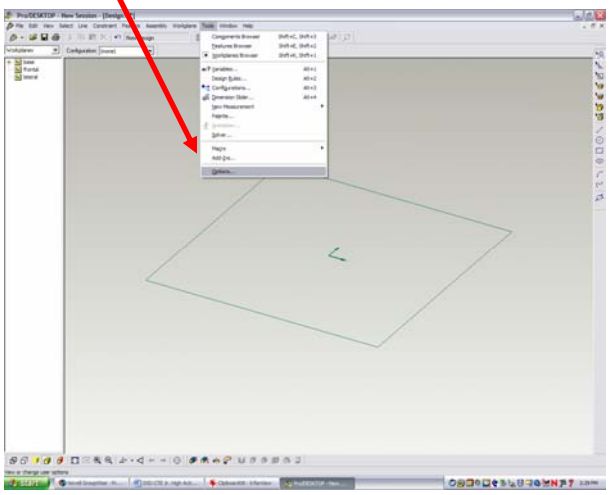


Step 4: Maximize the new design by clicking once in the maximize/restore down button.

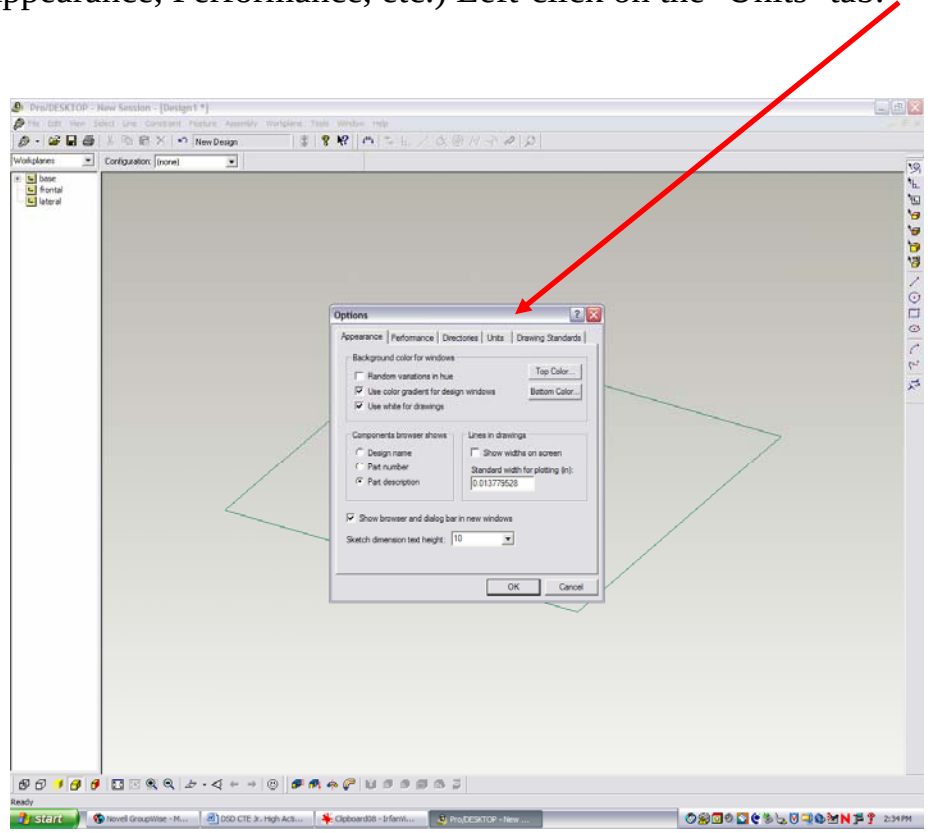


Step 5: The **sketch** (simple drawing) that you are making will be done in **inches**. To make sure PD is set to inches and not millimeters, do the following in order:

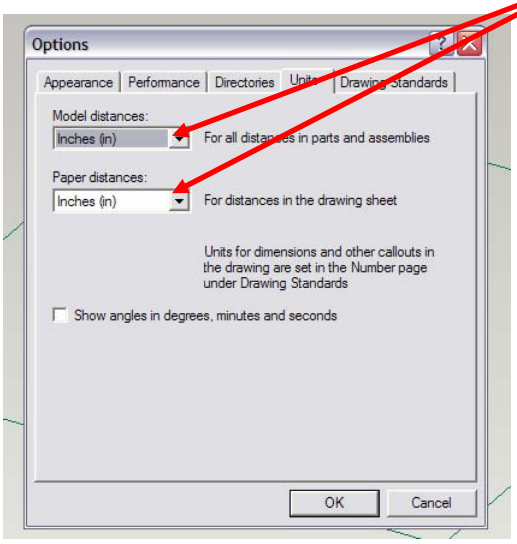
- Left-click the 'Tools' pull-down menu. Left-click on the word 'Options'.



- An ‘Options’ box will appear with several index tabs across the top (Appearance, Performance, etc.) Left-click on the ‘Units’ tab.



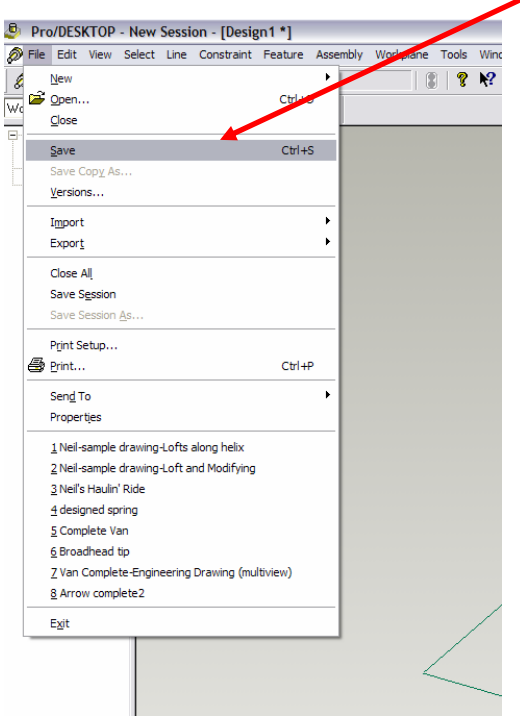
- Left-click on the scroll-down arrow and select ‘Inches’ for both fields if this unit does not already show in the two boxes as below:



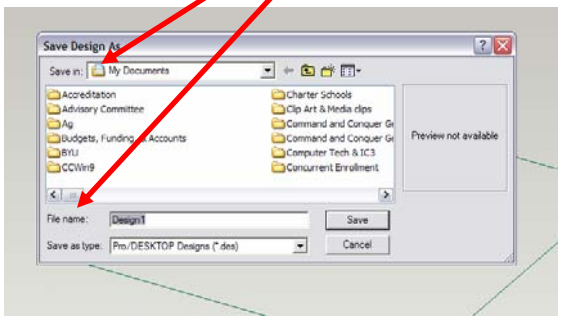
Click ‘OK’.

SAVE ME!!!!!

Have you ever forgotten to save an assignment and had to do it all over again? Try to remember to save your sketches often so that even small changes don't have to be done over. To save, left-click on the 'File' pull-down menu. Left-click again on 'Save'.



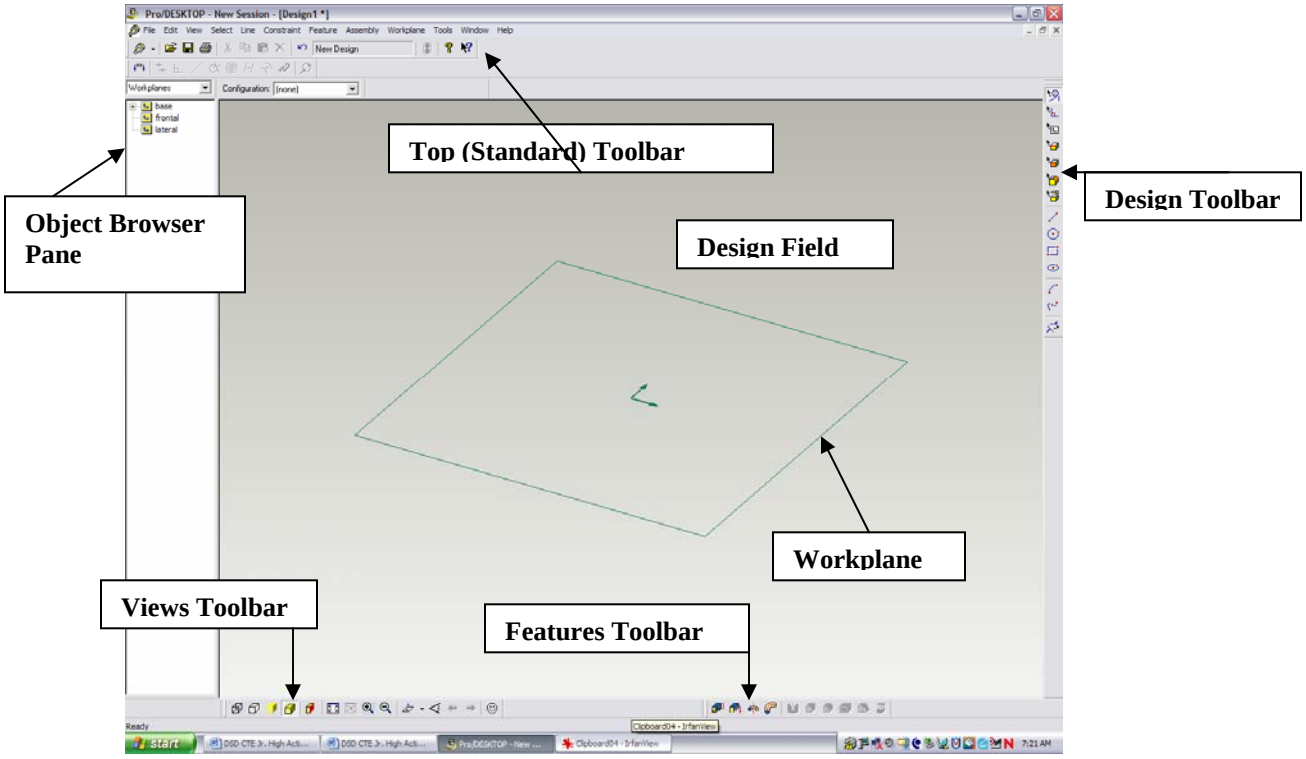
Your instructor will tell you to what location you must save your file and what you should name it.



What are all those icons for????

Every time you open a new design in PD, you will be presented with the screen below.

STUDY THIS NEXT SECTION CAREFULLY, PLEASE!!!!!



Toolbars hold icons that allow you to perform a variety of tasks. Your toolbars may be in a slightly different location than those shown here.

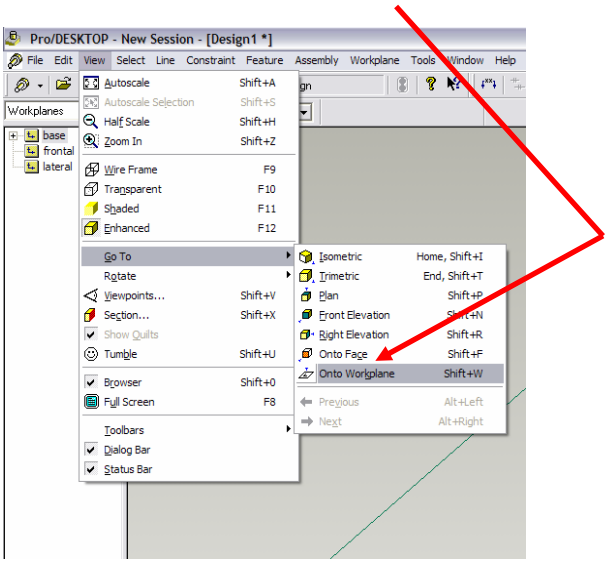
You will begin to make a sketch on a **workplane** in a **design field**.

The green rectangle that looks like it is lying 'flat and at an angle' in the design field is the **workplane**. The **design field** represents 'space' around your sketch so you can see the entire object as you design it. Later, you will learn how to zoom in or out in the design field.

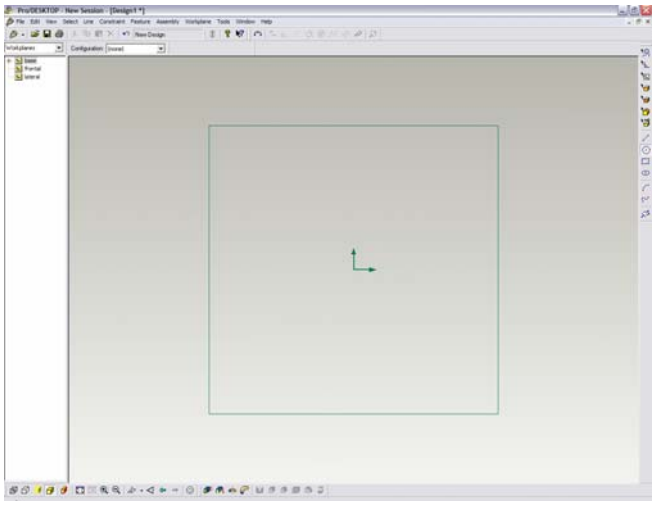
The workplane is like a sheet of paper on which you will sketch your design. The edges of the workplane would be the edges of your paper. If you draw something too large for the workplane, it will re-adjust the edges to fit your new design. Paper can't do that!

The angle at which it is laying is called an **isometric view**. ‘Isometric’ viewing is a simple way to look at an object from an ‘angle’ to see it better.

To change from the isometric to the workplane, or ‘flat’ view, left-click on the ‘View’ pull-down menu. Move the cursor down to the words ‘Go To’. **Without clicking**, move the cursor over to the words ‘Onto Workplane’. Left-click once.

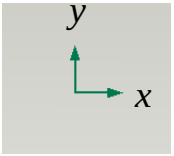


What happened?
You have now left the isometric or ‘angled’ view of your ‘paper’ and are looking directly at the workplane. It is as if you were standing above your desk looking directly down toward your sheet of paper.



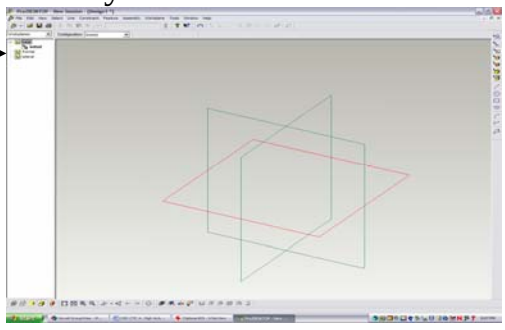
The green arrows indicate the **axes** of the sketch. Axes show the different directions that you may draw (such as left to right, top to bottom). The mathematical identifier for the most commonly used axes are *x* and *y*. These axes are mathematically written as (*x*,*y*) to show units of length from the **Point of Origin.** The Point of Origin is the spot where the two axes arrows come together.
For example, the mathematical expression (3,5) in relation to axes means that from the point of origin, the *x* axis is 3 units long and the *y* axis is 5 units long.

PD also has a third axis called '*z*'. *X* and *y* are two-dimensional. That means they only exist on a flat surface (*x* usually denotes left-to-right- and y is up-and-down). *Z* moves perpendicular to *x* and *y*. For example, take your pencil and a piece of scratch paper and draw a sketch of the axes you see here. It should look something like this:

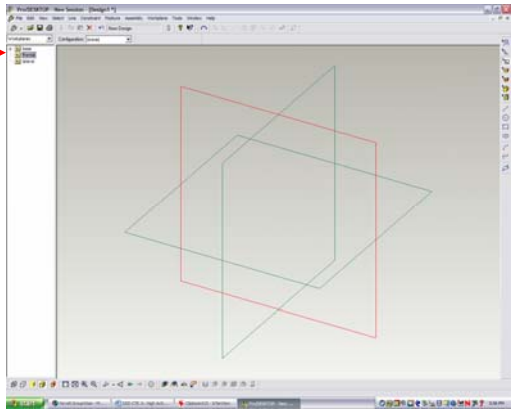


Now place the tip of your pencil on the point of origin of your axes and hold your pencil straight up. This axis that 'sticks out' of the drawing represents the 3-dimensional, 3-D, or *z* axis. *Z* adds 'thickness' and turns **2-D Drawings** (*x*,*y* axis) into **3-D Designs** (*x*,*y*,*z*). Now, change to a 'trimetric' view by **holding the shift key** and typing the letter "T".

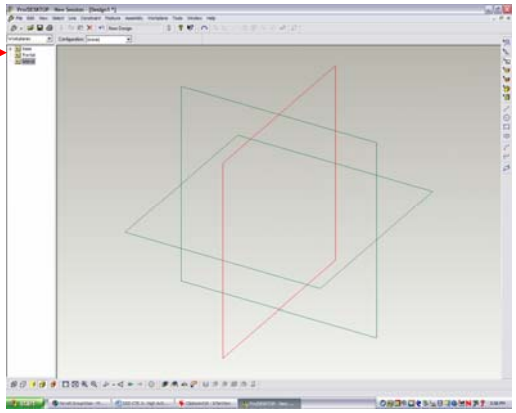
The **Object Browser Pane** allows you to view and to change more than one sketch on more than one workplane. In the Object Browser Pane, **bold letters** mean the current workplane is an '**active workplane**' or that you may work on that workplane only. Left click on the plus sign (+) by the 'base' workplane in the object browser pane. All of the present workplanes show up as isometric rectangles as below. The two other workplanes (frontal and lateral) show up in green. The active workplane called '**initial**' in the base workplane stays but turns **red** to show it is active or ready to be drawn on.



Left-click on the words ‘frontal’ and ‘lateral’ workplanes in the Object Browser Pane. Notice that the green rectangles become red to show this plane is the active one, or the one that a drawing would appear on.



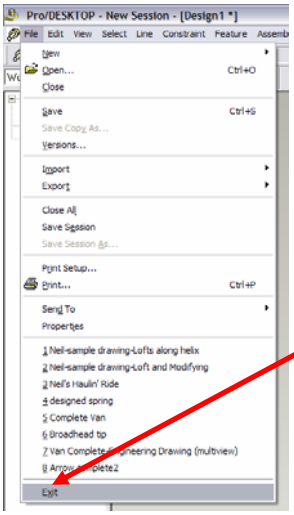
Frontal workplane



Lateral workplane

You can also create more workplanes besides those shown here. This is useful if you need to place more than one design in the same design field (you will learn more about this feature in future activities).

Since you have made no physical changes to the sketch, there is no need to save your file at this time.



After saving your file, you can safely close PD by left-clicking on the ‘File’ pull-down menu and left-clicking ‘Exit’.

You have completed the first activity using PD! Complete the following matching assignment on a separate sheet of paper

Student name:_____ Student Number:_____
Class period:_____Date:_____Teacher:_____

STUDENT WORKSHEET Pro/DESKTOP 3-D Modeling Software
Activity 1: "What I know and what I need to know"

Directions: Write the letter of the most correct definition to the term used in this activity in the space provided:

Term	Definition
___1. Graphic User Interface (or, GUI)	a) The green rectangle that looks like it is lying 'flat and at an angle'
___2. Icon	b) (*x*,*y* axis drawings)
___3. Cursor	c) The spot where the two axes arrows come together
___4. Pull-down menu	d) You may work on that workplane only
___5. Sketch	e) A simple way to look at an object from an 'angle' to see it better
___6. Design field	f) A picture on the computer screen that activates a command
___7. Workplane	g) Allows you to make more than one sketch on more than one workplane
___8. Isometric	h) Represents 'space' around your sketch so you can see the entire object as you design it
___.9 Axes	i) The mouse pointer
___10. Point of origin	j) 3-axis (*x*,*y*,*z*) objects
___11. Object browser pane	k) Words in the Top Toolbar that activate commands
___12. 2D (2-dimension)	l) A simple drawing
___13. 3D (3-dimension)	m) The different directions that you may draw (such as left to right, top to bottom)
___14. Toolbar	n) Shows the user what items are in view and what options a person can use as he or she runs a computer program
___15. 'Active' workplane	o) Holds icons that allow you to perform a variety of tasks